History and Geomorphology of Bunch Field Slough, 1906 through 2002

Bunch Field Slough is located on the north side of the Quinault River valley between RK 15.5 and RK 17.0 (Figure 1). It is between a bedrock knob that extends into the valley (downstream end) between RK 14 and RK 14.5 and the NPS Bridge near RK 17.5. The following discussion does not include 1962 or 1998, because aerial photographs taken in these years do not extend upstream to this area.

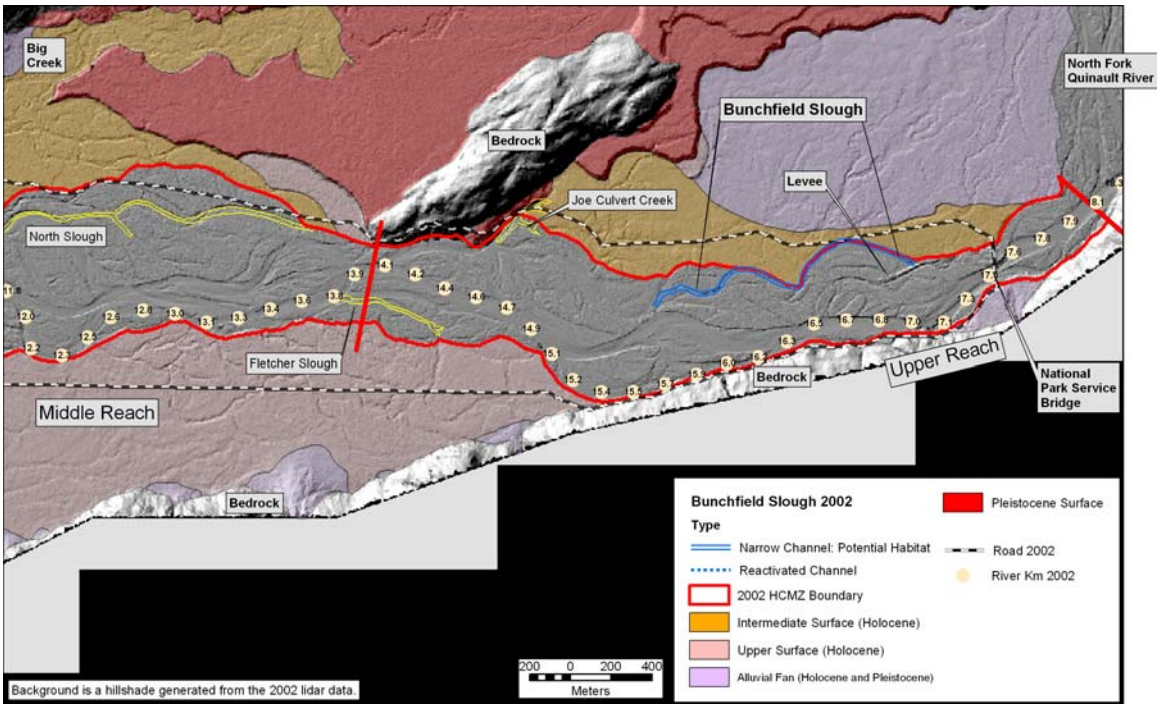

Figure 1. Bunch Field Slough is located between RK 15.5 and RK 17.0 along the north side of the historical channel migration zone (HCMZ). Background is a hillshade created from 2002 LiDAR data. River kilometers are from the low-flow channel at the time of a river survey in 2002.

Changes in Bunch Field Slough by Year

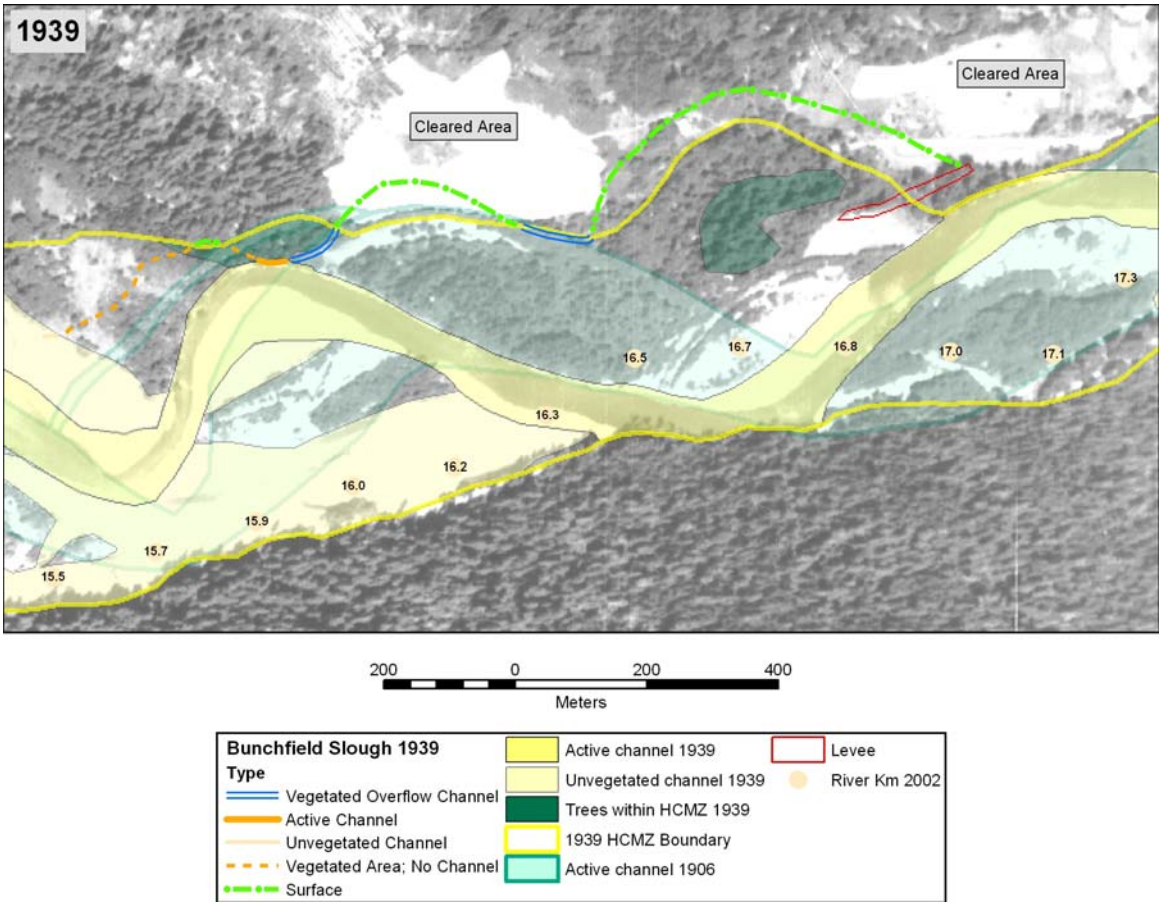

Figure 2. In 1906 (light green channel) and in 1939, none of Bunch Field Slough was present. A couple of short (100 to 200 m long) sections were present as part of the main Quinault River channel. However, most of the future Bunch Field Slough was outside of the channel zone in these years. The levee that is present by 1972 at the upstream end of the slough is shown as a reference point. The NPS Bridge near RK 17.5 had not yet been built in 1939. The cleared areas on the north side of the river are persistent through 2002, and may have influenced the migration of the Quinault River to the north and the resulting formation of Bunch Field Slough.

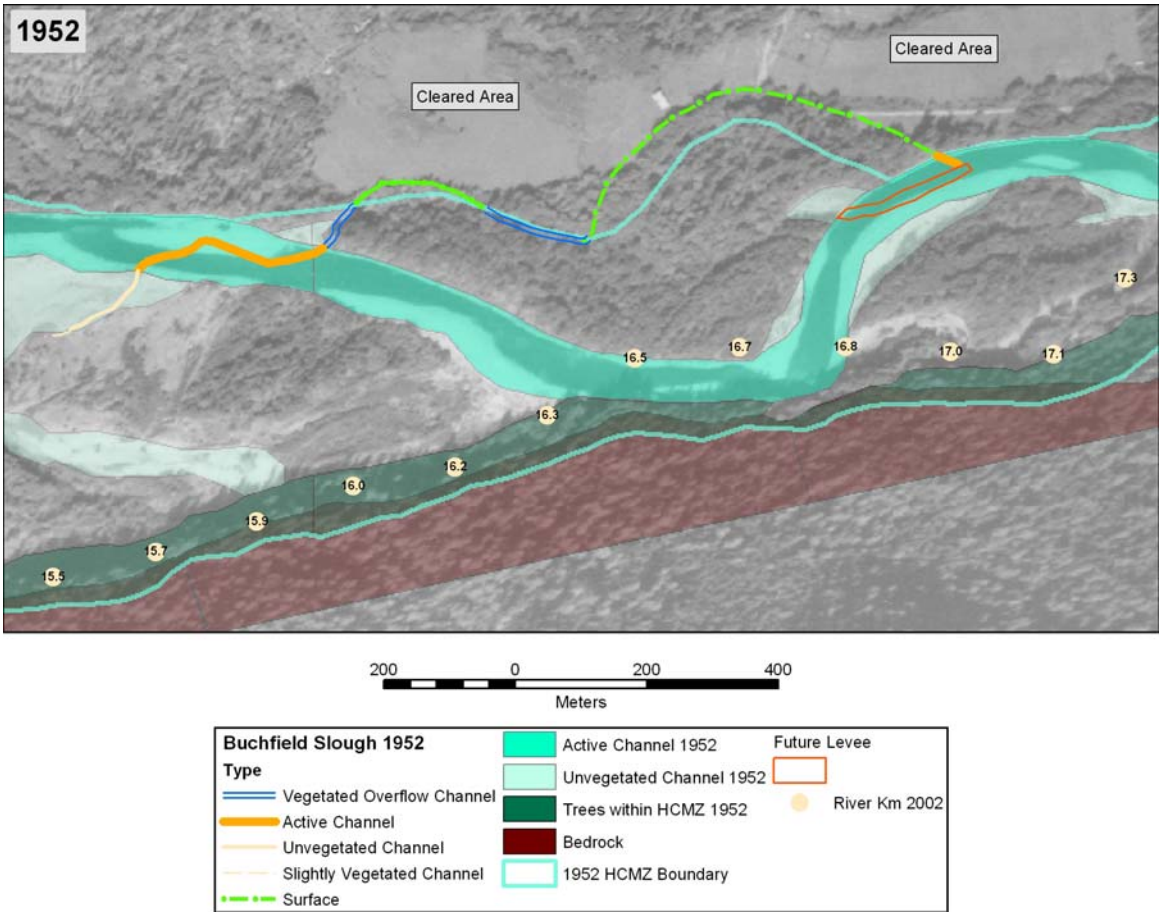

Figure 3. By 1952, the meander in the Quinault River channel between RK16.7 and RK 17.3 had moved outward by eroding into the bounding surface that was present in 1939. The recently excavated channel will become part of Bunch Field Slough. Similarly, the Quinault River between RK 15.5 and RK 16.0 had cutoff a meander and flowed in a north path that had eroded the 1939 bounding surface. This path becomes the downstream about 500 m of Bunch Field Slough. The NPS Bridge near RK 17.5 had not yet been built in 1952.

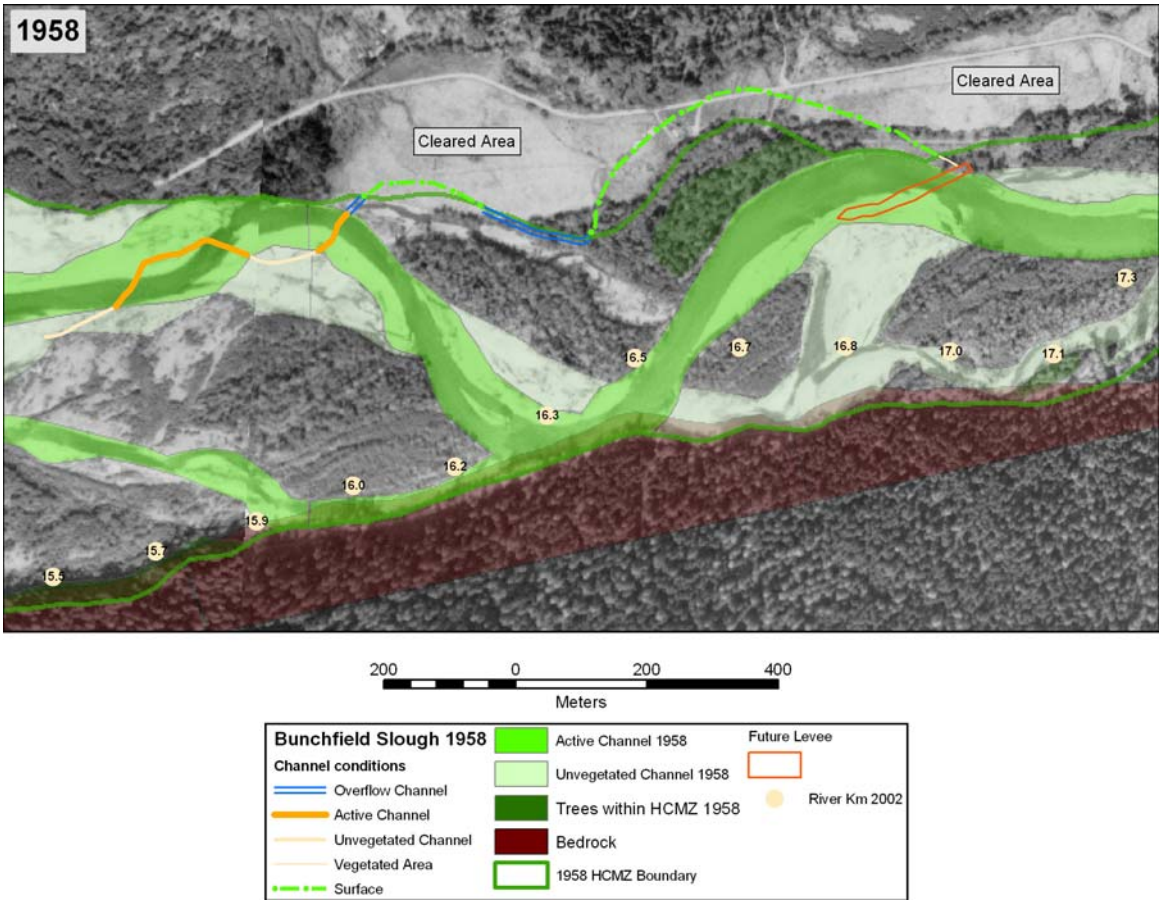

Figure 4. By 1958, the upstream meander in this section of the river had moved outward and downstream to near RK 16.5. The surface at the upstream end of Bunch Field Slough had eroded laterally, but not to the position of the future slough. At least half of the Bunch Field Slough still crossed the surface bounding the channel zone in 1958. A new overflow or side channel was present between RK 16.0 and RK 16.5. Part of this channel will become a section of Bunch Field Slough. The downstream about 600 m of the future Bunch Field Slough was part of the active and unvegetated channels of the Quinault River. This was the first year that the road and bridge near RK 17.5 are visible on the aerial photographs.

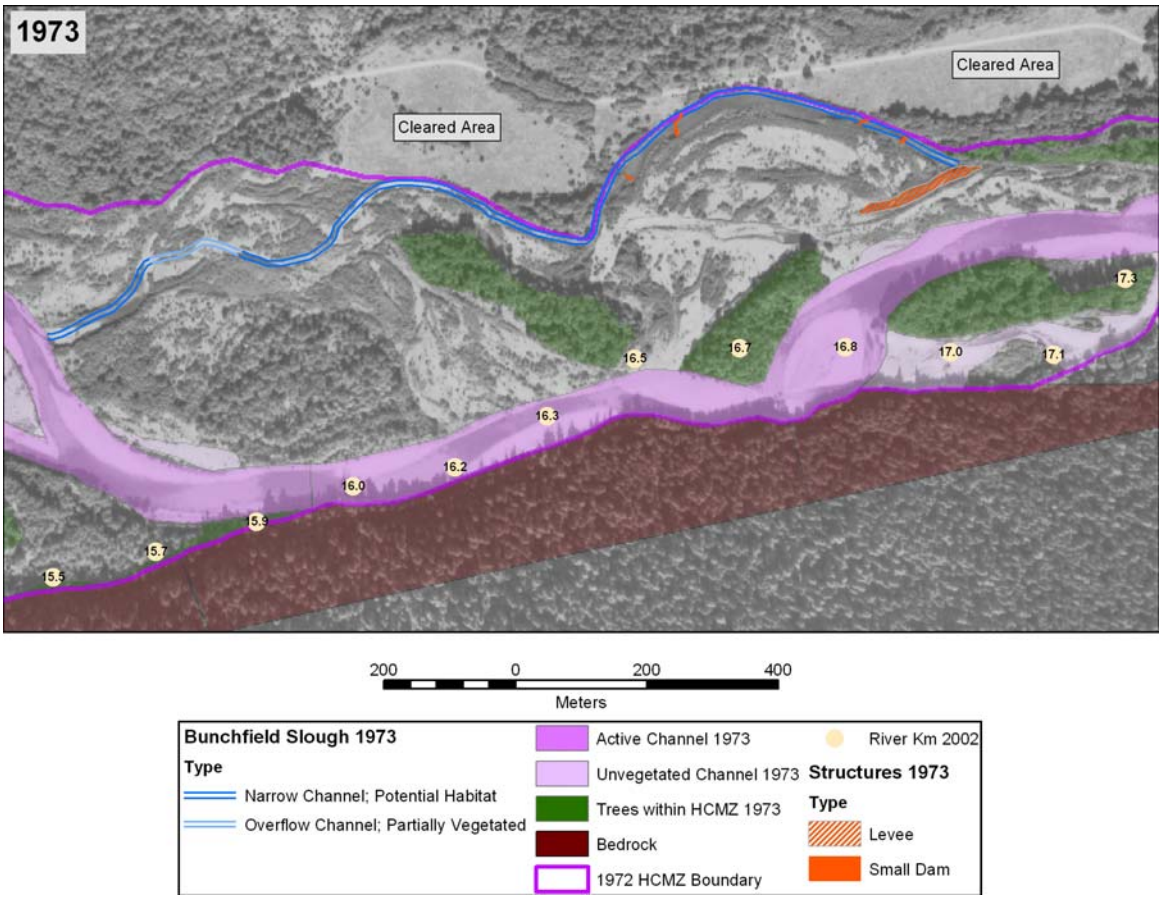

Figure 5. By 1973, most of Bunch Field Slough had been excavated, presumably by the active channel of the Quinault River. The slough had been abandoned as a main flow path and was a partially vegetated side channel. In addition, an earth levee had been built at the upstream end of the slough. The levee was likely at least partly responsible for the shift in the position of the main Quinault River channel to the south between RK 17.0 and RK 17.2. There were also four structures across Bunch Field Slough downstream of the levee. These appear to have been retention structures, although B. Armstrong (QIN, written commun., 2003) reported beaver dams that coincide with the location of two of these structures. The Quinault River channel flowed along the south side of the valley. Its migration to the south was restricted by bedrock.

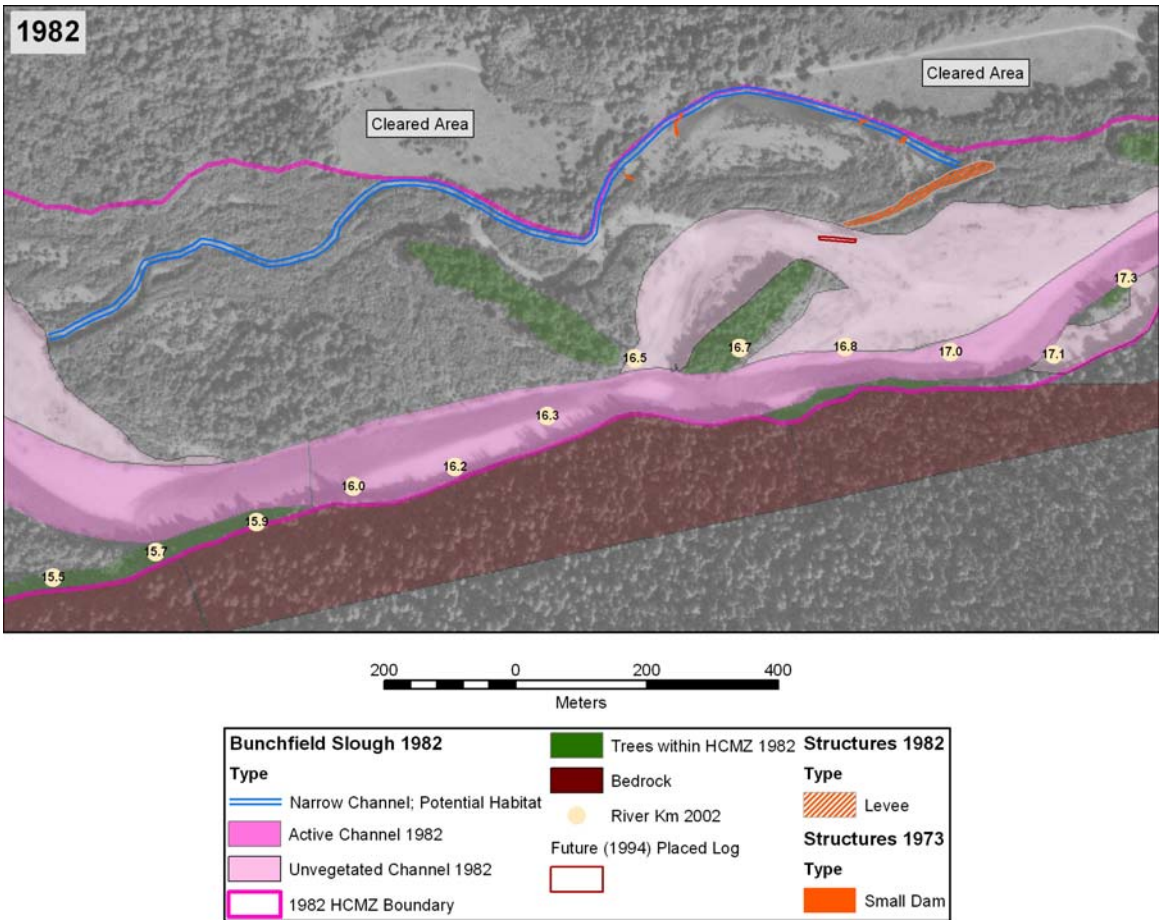

Figure 6. By 1982, the active channel of the Quinault River had straightened between RK 15.7 and RK 17.1 along the south edge of the valley. However, an unvegetated overflow channel had developed between RK 16.5 and RK 17.4, and removed some of the vegetation that was present in this area in 1973. Bunch Field Slough remained intact because of the levee at its upstream end. The configuration of the unvegetated overflow channel suggests that flow would have gone into Bunch Field Slough had the levee not been present. The position of a placed log at the downstream end of the levee that is visible in 1994 is shown for reference. The retention structures or beaver dams were still visible in 1982.

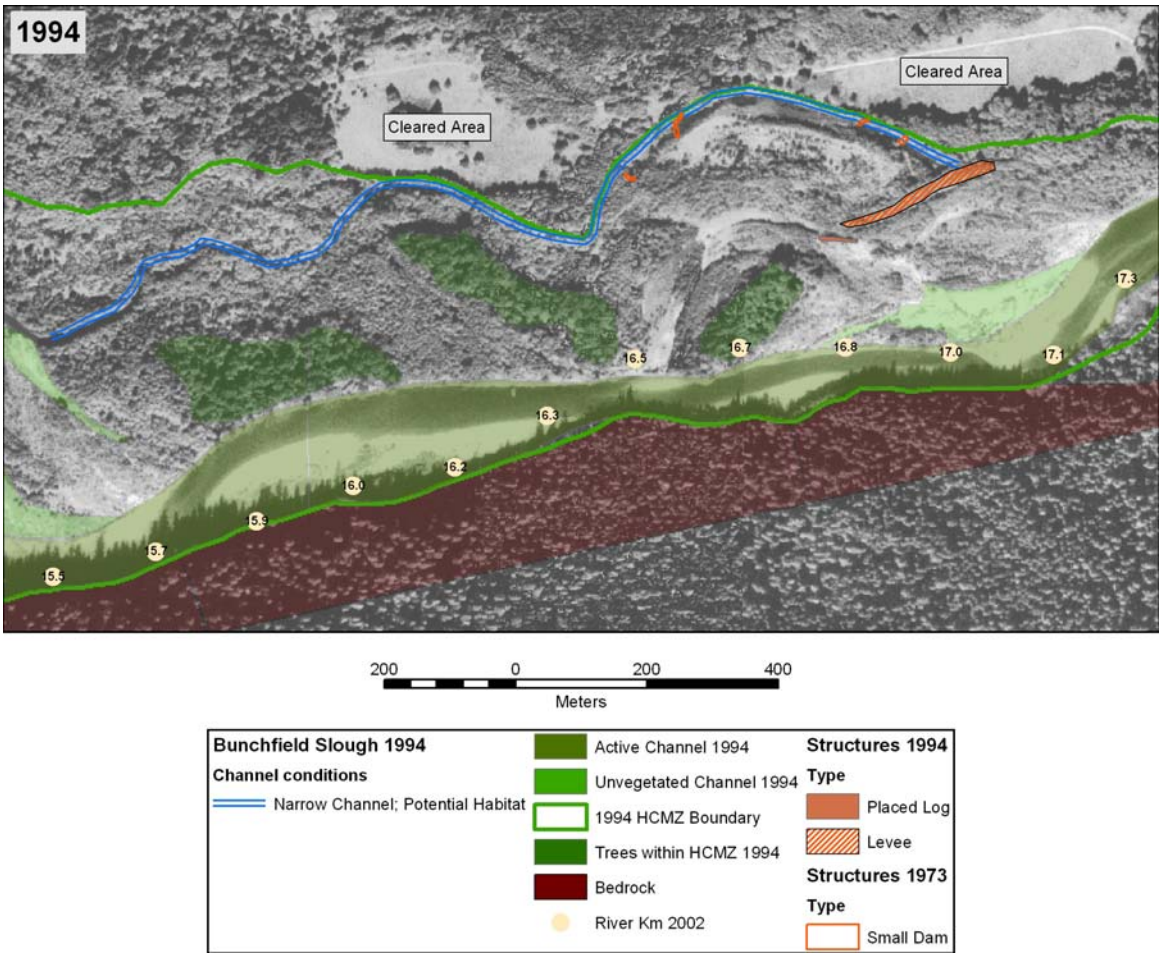

Figure 7. By 1994, the Quinault River channel still flowed along the south edge of the valley. Bunch Field Slough appears to be as it was in 1973. A log has been placed at the downstream end of the earthen levee, and was likely used to direct flow into the channel that it aligned with. The downstream end of the levee appears to have been lengthened and widened. The retention structures or beaver dams are difficult to distinguish on the photographs without knowing that they were present. However, the characteristics of Bunch Field Slough (e.g., vegetation, channel width, presence or absence of water) changed at these points. Vegetation was beginning to fill in the downstream cleared area between RK 16.0 and RK 16.5 outside of the historical channel migration zone.

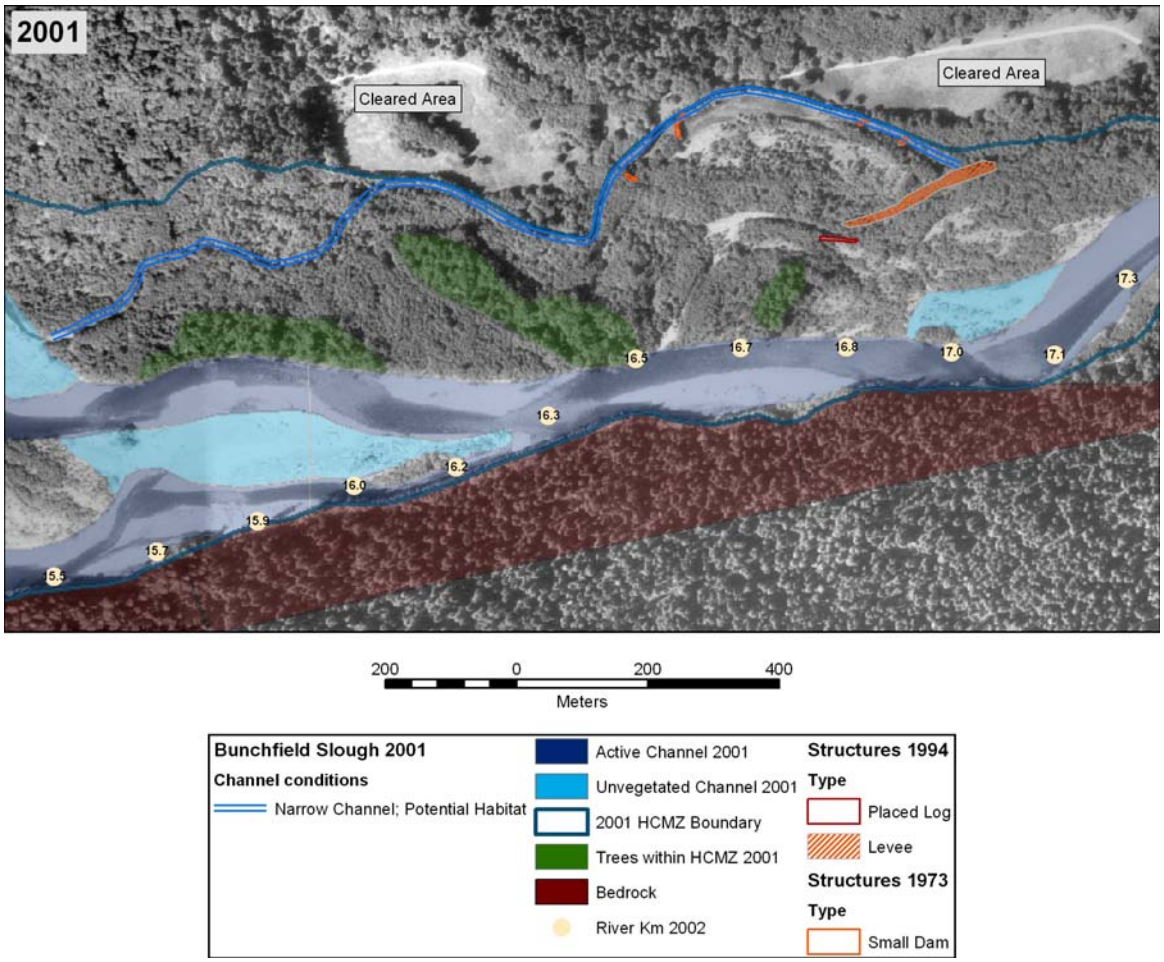

Figure 8. By 2001, the Quinault River channel and Bunch Field Slough appear to be much as they were in 1998. The area within the channel migration zone and north of the Quinault River had denser and larger vegetation. The earthen levee was still visible. Linear vegetation surrounded the placed log, which is no longer recognizable as a log. Similarly, the retention structures or beaver dams can only be recognized by changes in the characteristics of Bunch Field Slough.

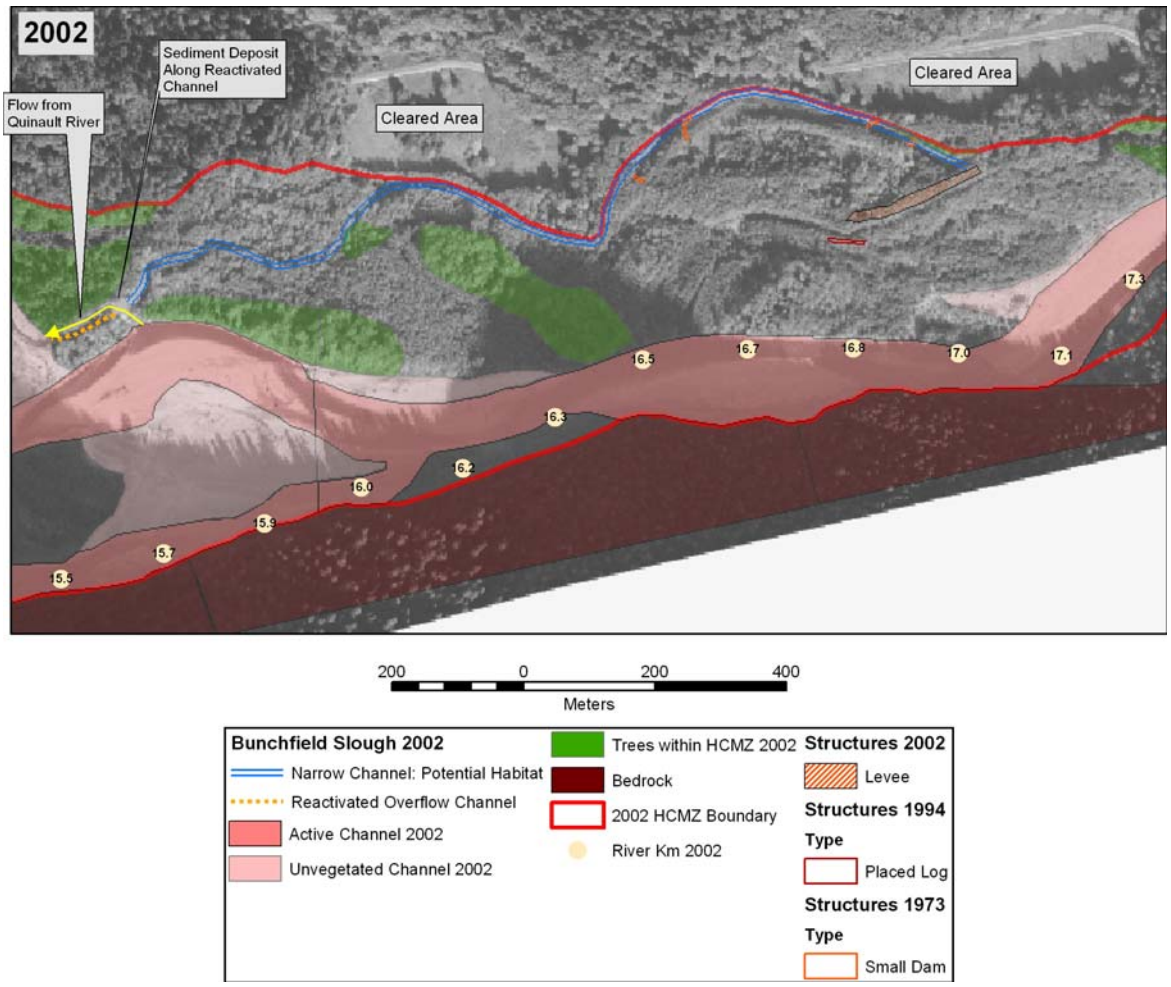

Figure 9. By 2002, the main difference in the Quinault River channel and Bunch Field Slough was between RK 15.5 and RK 16.2. The Quinault River had split into two flow paths. The north path had meandered close to the downstream end of the slough, and during a large flow, a flow path of the Quinault River went to the northwest and occupied the downstream about 130 m of the slough (shown by the yellow arrow). At a near-perpendicular bend in the flow path, where the Quinault River high flow encountered Bunch Field Slough, a sediment deposit is visible on the aerial photographs.

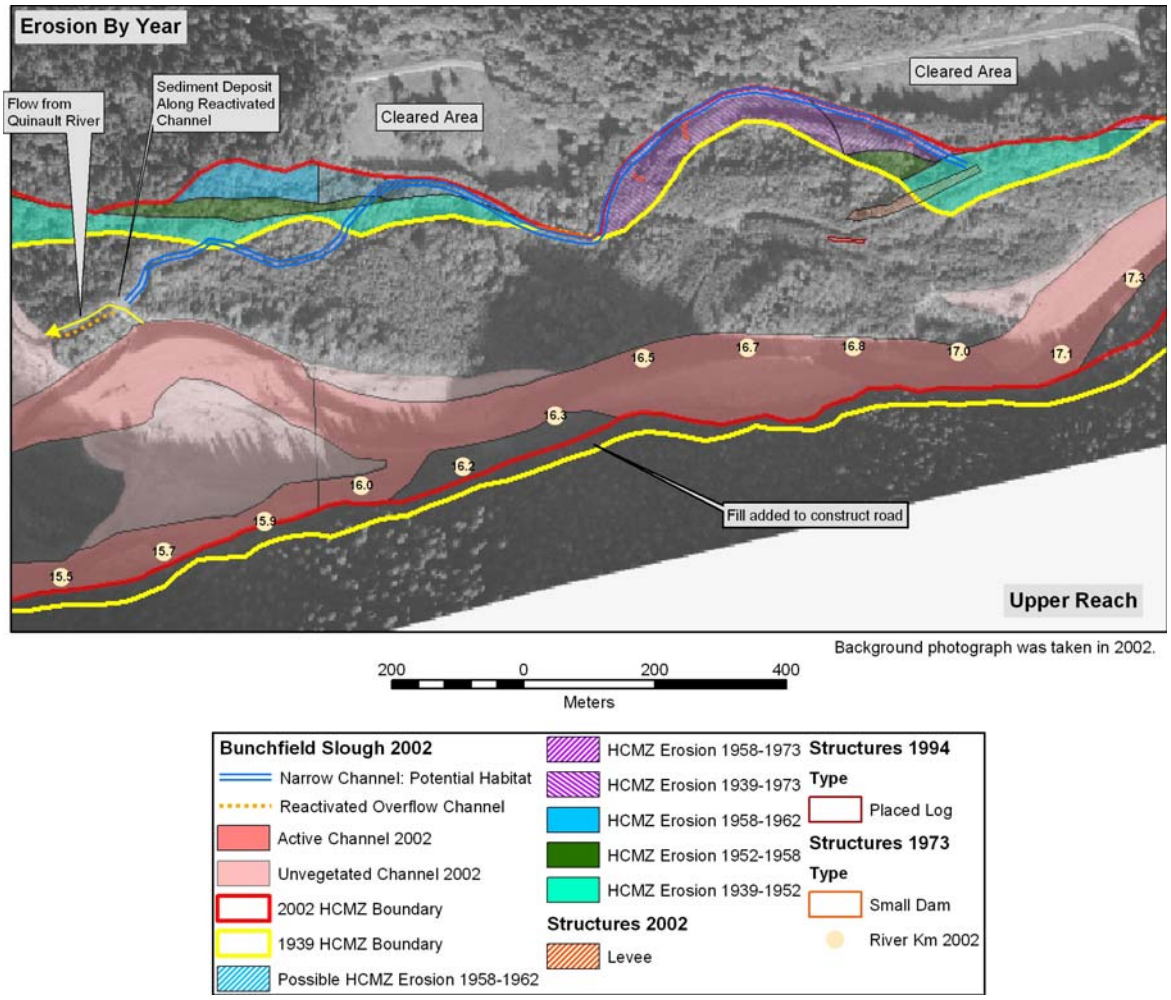

Figure 10. Bank erosion between 1939 and 1973 formed the channel that became Bunch Field Slough. Several areas are labeled as possible erosion because the time interval is unclear. The 1962 and 1998 aerial photographs do not extend upstream to Bunch Field Slough.